

**T13D02 – (13.2) D-Block Transition Metals**

Name.....

1. 13.2.1 List the characteristic properties of transition elements. (1)
  
2. 13.2.2 Explain why Sc and Zn are not considered to be transition elements. (3)
  
3. 13.2.3 Explain the existence of variable oxidation number in ions of transition elements. (3)
  - a. Complete the table below for the electron configuration of the transition metals:
  - b. What is different about Chromium and Copper:
  
  - c. Explain what oxidation states are possible for an individual atom:

El.	#	Noble Not.		3d					4s
Sc	21	$[\text{Ar}]3d^14s^2$	$[\text{Ar}]$						
Ti	22	$[\text{Ar}]3d^24s^2$	$[\text{Ar}]$						
V	23	$[\text{Ar}]3d^34s^2$	$[\text{Ar}]$						
Cr	24	$[\text{Ar}]3d^54s^1$	$[\text{Ar}]$						
Mn	25	$[\text{Ar}]3d^54s^2$	$[\text{Ar}]$						
Fe	26	$[\text{Ar}]3d^64s^2$	$[\text{Ar}]$						
Co	27	$[\text{Ar}]3d^74s^2$	$[\text{Ar}]$						
Ni	28	$[\text{Ar}]3d^84s^2$	$[\text{Ar}]$						
Cu	29	$[\text{Ar}]3d^{10}4s^1$	$[\text{Ar}]$						
Zn	30	$[\text{Ar}]3d^{10}4s^2$	$[\text{Ar}]$						

- d. What are the common ions of each of the first-row transition metals:


- e. What is the energy change during ionization?

4. 13.2.4 Define the term ligand. (1)
  - a. Define Ligand

- b. What are the common ligands? What are they also known as?

5. 13.2.5 Describe and explain the formation of complexes of d-block elements. (3)
  - a. Draw two complex ions, state their coordination numbers and provide a formula:



6. 13.2.6 Explain why some complexes of d-block elements are colored. (3)

7. 13.2.7 State examples of the catalytic action of transition elements and their compounds. (1)

a. Topic 06/16

8. 13.2.8 Outline the economic significance of catalysts in the Contact and Haber processes. (2)

a. Topic 06/16